REMARKS

The claims are 1-11 and 14-15. Claim 1 has been amended to account for errors in translation. Claim 5 has been amended to correct the error of not providing an antecedent basis for primary magnesium silicide referred to in the claim. Claim 11 has been amended to better clarify the invention. Claims 12 and 13 have been canceled in consideration of their rejections. New claims 14 and 15 have been added. Support for new claims 14 and 15 can be found in canceled claims 12 and 13. Reconsideration is respectfully requested.

The Examiner rejected claims 1 and 8-11 under 35 U.S.C. §103(a) as being unpatentable over *Lee et al. U.S. Patent No. 6,419,769* in view of *Schmid et al. U.S. Patent No. 5,178,686*. Claim 2 was rejected under 35 U.S.C. §103(a) as being unpatentable over *Lee et al.* and *Schmid et al.* in further view of *Volume 7 of the 1998 9th Edition ASM Handbook*. Claims 3 and 4 were rejected under 35 U.S.C. §103(a) as being unpatentable over *Lee et al.* and *Schmid et al.* in further view of *Volume 15 of the 1988 9th Edition ASM Handbook*. Claim 6 was rejected under 35 U.S.C. §103(a) as being unpatentable over *Lee et al.* and *Schmid et al.* and further in light of the disclosure of Applicant's

specification at pg. 5, paragraph 3 whereat Applicant discloses that known hot-forming methods include extrusion, hot rolling, and forging.

This rejection is respectfully traversed.

As set forth in Applicant's independent claim 1, Applicant claims a method for the production of a material, whereby an aluminum-based alloy having a content of 5.5 to 13.0 mass-% silicon and a content of magnesium according to the formula

$$Mg\ [mass\text{-}\%] = 1.73 \times Si\ [mass\text{-}\%] + m$$

where m = 1.5 to 6.0 mass-% magnesium

as well as having a copper content between 1.0 and 4.0 mass-% is produced, the base alloy subsequently undergoes hot-forming at least once, and is then subsequently subjected to a heat treatment consisting of solution heat treatment, quenching, and artificial aging.

None of the references cited taken singly or in combination discloses or suggests a method of producing a material with a composition according to the formula provided above, performing hot-forming on the material or base alloy, and then performing a heat treatment on the base alloy including a solution heat

treatment, a quenching, and an artificial aging.

The *Lee et al.* reference does not disclose performing a hot-forming, for example extrusion, hot-rolling or forging, on a material or base alloy that has been produced. As indicated in the First Office Action, *Lee et al.* discloses performing a solution heat treatment, a quenching and an artificial aging on article formed from an alloy (see *Lee et al.* at column 4 lines 50-61). The article, such as an engine block or a piston, is processed using conventional gravity casting (see *Lee et al.* at column 4 lines 40-41 and 50-51). Applicant's invented method as claimed in claim 1 includes performing a series of heat treatments only on a base alloy or material that has undergone a hot-forming and not on an article produced from gravity casting.

The hot-forming and subsequent heat treatments will often be performed on a base alloy in the form of a cylindrical block (see Example 1 of spec on pg. 6). Applicant's invented method as claimed in claim 1 does not include performing a series of heat treatments on an engine block or piston formed from gravity casting.

Although the Examiner considered the gravity casting disclosed in *Lee et al.* to meet the limitation of Applicant's claim 1 of the base alloy being subsequently heat-formed, it is respectfully submitted that the hot-forming claimed in Applicant's current claim 1, that is now amended for purposes of correcting errors in translation, does not include conventional gravity casting. The hot-forming claimed in Applicant's claim 1 refers to processes such as extrusion, hot rolling, and forging that work with solid materials, and not conventional gravity casting that deals with a liquid material. See Applicant's specification on pg. 5, paragraph 3.

This failure of the *Lee et al.* reference to disclose all of the steps of Applicant's invented method as claimed in claim 1 is nowhere remedied by the secondary reference to *Schmid et al.*, which does not disclose any post-production steps for treating lightweight cast material. Applicant's invented method as claimed in claim 1 would thereby not be obvious to one of skill in the art in view of the *Lee et al.* and *Schmid et al.* references.

The Examiner looks to Applicant's own specification to support her argument that it would have been obvious to one of

skill in the art to perform extrusion, hot rolling, or forging on the base alloy produced (see Examiner's rejection of claim 6). It is respectfully submitted that it is not obvious to perform such a hot-forming on a material produced with the composition of the formula found in Applicant's claim 1, and to thereafter perform additional heat treatment steps on the material. The *Schmid et al.* reference cites the *Mondolfo* publication which teaches that aluminum alloys with more than 2% by weight magnesium silicide have problems with deformation (Col. 2 lines 41-47). Applicant's method of producing an aluminum alloy includes adding far more than 2% by weight of magnesium silicide, and is still sufficiently deformable to undergo a subsequent hot-forming.

Applicant's invented method as recited in claim 1 can include adding up to 35% by weight magnesium silicide. Additionally, because magnesium is added in Applicant's process always in excess to the silicon that reacts with magnesium to form magnesium silicide, there is no excess silicon in the material produced by the Applicant's method. Thereby no ternary Al-Mg_2Si-Si eutectic alloy is formed, as can be formed in the lightweight cast material disclosed in *Schmid et al.* Applicant's inventive method produces an aluminum alloy material with a

unique chemical composition resulting in a unique combination of properties including superior fatigue resistance and superior performance on static and dynamic tests. These properties are not found in the aluminum alloys of the prior art that are especially suitable for piston production (see charts on pgs. 9 and 10 of the specification).

As the prior art references taken singly or in combination do not disclose Applicant's invented method as found in claim 1 and claims 2-11 and 14-15, which depend directly or indirectly on claim 1, it is respectfully submitted that the claims are patentable and allowable over the cited references.

In summary, claims 1, 5, and 11 have been amended, claims 12 and 13 have been canceled, and new claims 14 and 15 have been added. In view of the foregoing, it is respectfully requested that the claims be allowed and that this application be passed to issue.

Respectfully submitted,
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